PATENT SPECIFICATION

DRAWINGS ATTACHED

970,887

970.887

Date of filing Complete Specification (under Section 3 (3) of the Patents Act, 1949) Jan. 29, 1963.

Application Date Feb. 9, 1962. *No. 5125/62.*

Application Date Jan. 17, 1963. *No. 2196/63.*

Complete Specification Published Sept. 23, 1964.

Index at acceptance—F2 G31A

International Classification:—F 06 l

COMPLETE SPECIFICATION

Pipe Coupling

I, LEWIS MERVYN CECIL SEAMARK, of Pyne Cliff, Lyme Regis, Dorset, Of British Nationality. do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to a pipe coupling for pipes, particularly for pipes with plain ends, but is also applicable to the connecting together of pipes bevelled for welding and to grooved pipes.

The invention has among its objects to [illegible] for releasably coupling [illegible] longitudinal axes at an angle without affecting the sealing of the coupling on the pipe ends.

The pipe coupling according to the invention comprises a gapped and/or slotted sleeve, serrated on the inner face and buttress screw threaded on the outer periphery for mounting on each of the pipe ends to be coupled, and clamping means internally and correspondingly screw threaded to engage with the screw threads on the sleeves for limited axial movement, changing partly into radial movement between clamping means and sleeves.

Thus relative axial movement between sleeve and clamping member will continue until the axial movement is stopped, after which further relative movement between sleeve and clamping member will continue at least partially in a radial direction of the sleeve to apply increasing gripping pressure by the sleeve on the pipe end.

Relative axial movement between sleeve and clamping member may be limited by the provision of stop means, advantageously formed as an inwardly extending flange at the inner end of the clamping member, and forming the end face of the recess in the clamping member in which the screw-threaded slotted and/or gapped sleeve member is received. On the other side of the flange is formed a recess to receive a sealing ring.

Each clamping member may be formed with [illegible] back at an angle and a middle

SPECIFICATION NO. 970,887

Inventor: Lewis Mervyn Cecil Seamark

By a direction given under Section 17(1) of the Patents Act 1949 this application proceeded in the name of SEAMARK COUPLINGS LIMITED, of Candlewick House, 116-126 Cannon Street, London, E.C.4., a British company.

THE PATENT OFFICE

D 29758/1(6)/R.109 200 10/64 PL

the middle member, the pipe is caused [illegible] moved so that its longitudinal axis may assume an angular position.

The annular cover may be secured to the middle member as by means of parallel bolts extending through holes provided partly in the cover and partly in the middle member. Other equivalent means may however be provided for this purpose.

Similar grooves formed partly in the surface of the side faces of the middle member and partly in the end faces of the clamping member may form recesses to receive sealing rings.

To increase the flexibility of the sleeve in cases where the sleeve is made of hard metal and/or of heavy section metal, lengthwise slots

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The invention relates to a pipe coupling for pipes, particularly for pipes with plain ends, but is also applicable to the connecting together of pipes bevelled for welding and to grooved pipes.

The invention has among its objects to provide a pipe coupling for releasably coupling together pipes having plain ends, whereby a fluid-tight joint is produced, the efficiency of the joint being increased by pressure in the pipe and by any stretching force applied to the coupling.

A further object of the invention is to provide a pipe coupling in which the inconveniences, normally caused by the manufacturer's tolerance variation in the external diameters of the pipes, are obviated.

A still further object of the invention is to provide a coupling so constructed that the two pipes coupled may be readily set with their longitudinal axes at an angle without affecting the sealing of the coupling on the pipe ends.

The pipe coupling according to the invention comprises a gapped and/or slotted sleeve, serrated on the inner face and buttress screw threaded on the outer periphery for mounting on each of the pipe ends to be coupled, and clamping means internally and correspondingly screw threaded to engage with the screw threads on the sleeves for limited axial movement, changing partly into radial movement between clamping means and sleeves.

Thus relative axial movement between sleeve and clamping member will continue until the axial movement is stopped, after which further relative movement between sleeve and clamping member will continue at least partially in a radial direction of the sleeve to apply increasing gripping pressure by the sleeve on the pipe end.

Relative axial movement between sleeve and clamping member may be limited by the provision of stop means, advantageously formed as an inwardly extending flange at the inner end of the clamping member, and forming the end face of the recess in the clamping member in which the screw-threaded slotted and/or gapped sleeve member is received. On the other side of the flange is formed a recess to receive a sealing ring.

Each clamping member may be formed with its inner face cut back at an angle and a middle member formed with an annular periphery and with two correspondingly inclined side faces adapted for contact engagement with the correspondingly inclined side faces of the pipe-clamping members and formed to a wedge or taper, with an annular cover secured, as by bolts or in an equivalent manner, to the middle member to form a rigid unit, said annular cover having an inwardly extending annular flange at each end engaging over an outwardly projecting shoulder formed at the inner end of each clamping member, whereby, on rotation of a clamping member relatively to the middle member, the pipe is caused to be moved so that its longitudinal axis may assume an angular position.

The annular cover may be secured to the middle member as by means of parallel bolts extending through holes provided partly in the cover and partly in the middle member. Other equivalent means may however be provided for this purpose.

Similar grooves formed partly in the surface of the side faces of the middle member and partly in the end faces of the clamping member may form recesses to receive sealing rings.

To increase the flexibility of the sleeve in cases where the sleeve is made of hard metal and/or of heavy section metal, lengthwise slots

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may be formed in the sleeve extending from one end to a distance short of the opposite end and spaced apart circumferentially.

In the coupled position the device may conveniently be locked in position in suitable manner by the provision of means for preventing relative rotation between the clamping member and the slotted or gapped sleeve.

The clamping member may be provided as a single member to engage over the sleeves on the ends of two pipes to be coupled together and may be formed with the bores at the opposite ends out of axial alignment one with the other to present the pipes at an angle.

The coupling may be made of any suitable material but is advantageously made of a durable metal.

The coupling is adapted for effective use with pipes made of steel or of any resilient material such as, for example, a plastic.

The sealing rings are mounted in recesses, in such manner as to be movable to provide an effective seal for preventing the escape of pressure from inside the pipes outwardly, and from outside the pipes inwardly.

The coupling may be applied to pipes of varying diameters within determined ranges.

The invention further comprises the features of construction hereinafter described.

The invention is diagrammatically illustrated by way of example in the accompanying drawings, in which:—

Figure 1 is a sectional elevation of a pipe coupling according to the invention;

Figure 2 is an end elevation of the gapped sleeve member;

Figure 3 is a sectional plan of a modified construction of a pipe coupling according to the invention;

Figure 4 is an enlarged sectional view of one end of a pipe coupling according to the invention;

Figure 5 is a sectional elevation of a modified gapped sleeve member;

Figure 6 is a plan view in half-section of a further modification of a pipe coupling according to the invention, and

Figure 7 is a corresponding end view in half-section.

In carrying the invention into effect according to one construction as illustrated in Figures 1 and 2 of the drawings, two gapped sleeve members 1 are each formed on the inner periphery with serrations 2, and are each adapted to be slid on to one of the ends 3 of the pipes to which the coupling is to be applied.

On the outer periphery, each gapped sleeve member 1 is formed with a buttress screw-thread 4. The screw-thread 4 engages with a corresponding buttress screw-thread 5 of the same pitch, provided on the inner surface of a sleeve, provided as a clamping member 6 which extends across the pipe ends to be connected.

Sealing rings 7 are mounted in annular recesses provided in the bore of the clamping member 6 and bear against the external surface of the pipe ends 3.

In operation, relative rotation between the gapped sleeve members 1 and the clamping sleeve member 6 will first cause relative axial movement until the inner ends of the gapped sleeves bear up against the outer sides of the annular flanges 8. Further rotational movement causes the inter-engaging buttress screw-threaded portions of the gapped sleeve members 1 and the clamping member 6 to ride over one another, causing the gapped sleeve members 1 to be pressed radially inward so as to cause the projections or serrations 2 to bite into the outer surfaces of the walls of the pipes. Any force tending to pull the pipes apart will cause the radial gripping pressure to increase.

As shown in Figure 3 the clamping member 9 may be angled, so that the bores provided in the ends of the clamping member are not in axial alignment. In such a coupling a tapering internal flange 10, may be provided, against which the ends of the pipes abut.

As illustrated in Figure 4 any force applied to the pipe in the direction of the arrow which would tend to stretch the coupling serves to increase the efficiency of the joint. Such a force could be caused by the pipe being laid vertically or over sloping ground, by heat expansion and contraction of the pipes, or by an increase of pressure of the fluid within the pipes. Thus the applied force tends to pull the gapped sleeve 1 out of the clamping member and the buttress threads 4 and 5 riding on one another exert an inwardly directed radial force on the gapped sleeve 1 pressing the serrations further into the pipe wall.

As shown in Figure 5 a gapped sleeve member 11 may be provided with longitudinal slots 12 extending over a part of the length of the member, reducing the applied force necessary, to distort the member, and to press the serrations 2 into the outer wall of the pipe.

As illustrated in Figures 6 and 7 of the accompanying drawings, a variably angled coupling may be formed by providing two clamping members 13, the inner end faces of the clamping members 13 being cut at an angle so as to present in inclined flat face in contact with the corresponding cut away inclined side faces of a middle member 14 which tapers from top to bottom and separates the ends of the two pipes to be coupled together.

A seal is maintained between the contacting end faces of the clamping members 13 and the middle member 14 by means of sealing rings 7 mounted in recess 15 of circular section provided half in the inclined surface of the clamping members 13, and half in the inclined surface of the middle member 14.

The outer surfaces of the clamping members are cut away to present an upwardly projecting annular shoulder 16 which is engaged by the turned-down annular flange 17 of a cover 18 formed as an annular sleeve surrounding the middle member 14.

In order to lock the cover 18 to the middle member 14 bolts 19 are passed through parallel holes 20 formed partly in the peripheral surface of the middle member 14 and partly in the inner surface of the cover 18. Nuts 21 are provided on the screw-threaded ends of the bolts 19 to secure the middle member rigidly to the cover.

It will be understood, however, that any other equivalent means may be used for the purpose as, for example, a pin formed on the outer periphery of the middle member to engage in a hole provided in the inner surface of the cover.

In operation of the coupling, to vary the angle of the inclination between the longitudinal axes of the two pipes coupled together, the middle member 14 is rotated relatively to one or both of the clamping members 13, thus varying the relative angularity of the pipes, without affecting the efficiency of the fluid-tight coupling.

In one Example, the inclination of the inner end face of one clamping member may be 10° so that a variation of angle within the range zero to 20° can be obtained. By a corresponding relative rotation between the middle member and the clamping member on the other side a further 20° of variation of angle can be secured making a maximum of 40° possible.

In the embodiment illustrated in Figure 1 a clamping sleeve 6 may either be provided with a left hand screw thread at one end and a right hand thread at the other, the threads mating with correspondingly threaded slotted sleeve members 1, and the coupling assembled by rotating the clamping sleeve 6. Alternatively the clamping sleeve 6 may be formed with a similar thread at each end, and the coupling asembled by screwing the clamping sleeve 6 on to one pipe, and then inserting and rotating the other pipe. The second mentioned alternative has the advantage that the threads at each end act against each other to prevent the coupling from becoming unscrewed and thereby loosened.

Alternatively the member 1 may be first inserted into the clamping member 6 and then the pipe ends 3 may be pushed into the gripping members 1 and tightened up by rotating the pipe 3 and the gripping members 1 in relation to part 6.

WHAT I CLAIM IS:—

1. Means for coupling pipes having plain ends, comprising a gapped and/or slotted sleeve, the sleeve having an inner diameter smaller than the outside diameter of the pipes to be coupled, being serrated on the inner face, buttress screw threaded on the outer periphery and adapted to be forced onto the pipe ends to be coupled and clamping means internally and correspondingly screw-threaded to engage with the buttress screw threads on the sleeves so that limited axial movement of the sleeve with respect to the clamping means causes an inwardly directed radial component of force to be applied to the pipe end.

2. Means for coupling pipes having plain ends according to claim 1, in which means are provided creating a force tending to prevent the continuance of the relative axial movement between the gapped and/or slotted sleeves and the clamping means, and to create a relative radial movement urging the serrations on the gapped sleeves to bite into the outer walls of the pipe ends.

3. Means for coupling pipes having plain ends according to claim 1 or 2, including clamping means provided as at least two clamping members, each clamping member being formed with its inner face cut back at an angle, a middle member formed with an annular periphery, and with two flat side faces adapted for contact engagement with the correspondingly inclined side faces of the clamping members and formed to a wedge or taper, and an annular cover secured to the middle member to form a rigid unit and engaging the inner ends of the clamping members, whereby on rotation of a clamping member relatively to the middle member, the pipe is caused to be moved so that its longitudinal axis may assume an angular position.

4. Means for coupling pipes having plain ends according to claim 3, in which the annular cover has an inwardly extending annular flange at each end extending over an outwardly projecting shoulder formed at the inner end of each clamping member.

5. Means for coupling pipes having plain ends according to claim 1 or claim 2, in which sealing rings are provided in recesses in the clamping means, creating a seal between the pipes and the clamping means.

6. Means for coupling pipes having plain ends according to claim 2, in which sealing rings are provided in recesses formed partly in the middle member and partly in the clamping members.

7. Means for coupling pipes having plain ends according to claim 1, in which the clamping means is formed as a single clamping member extending across the joint between the pipe ends.

8. Means for coupling pipes having plain ends according to claim 7, in which the bores are formed in the clamping means to receive the gapped and/or slotted sleeves provided with their axes at an angle.

9. Means for coupling pipes having plain

ends, substantially as hereinbefore described and illustrated in the accompanying drawings.

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Agents for the Applicant.

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970887 COMPLETE SPECIFICATION
3 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 1

Fig. 1.

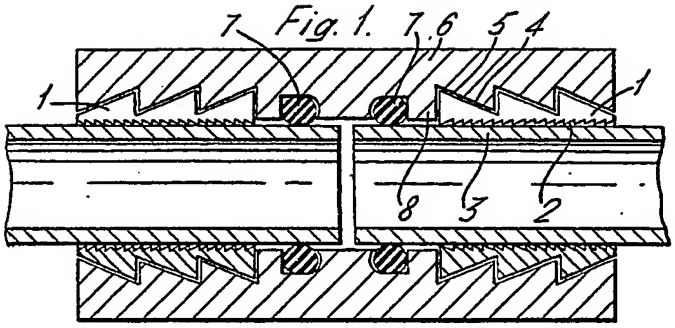


Fig. 2.

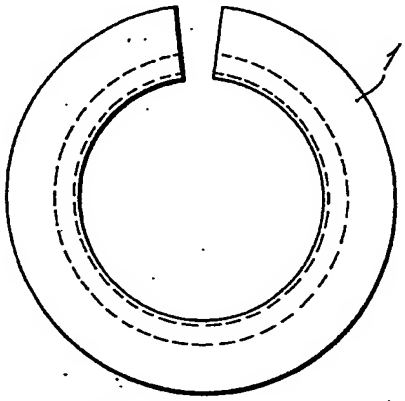


Fig. 4.

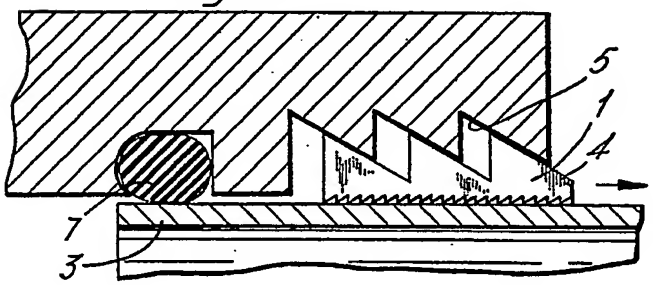


Fig. 3.

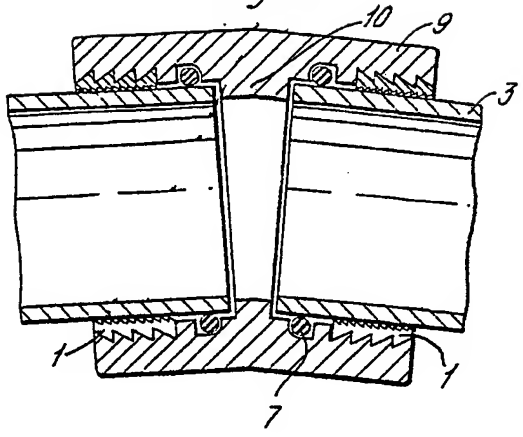
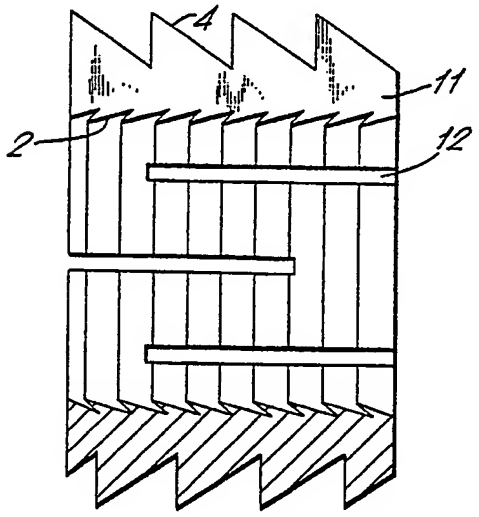


Fig. 5.



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3 SHEETS *This drawing is a reproduction of the Original on a reduced scale*

Sheets 2 & 3

Fig. 6.

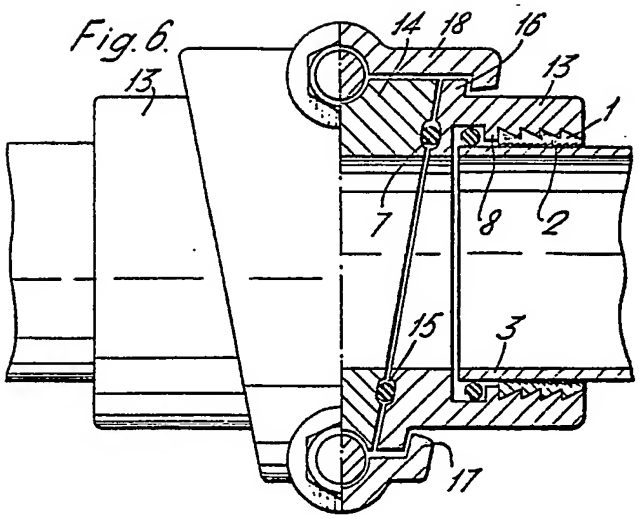
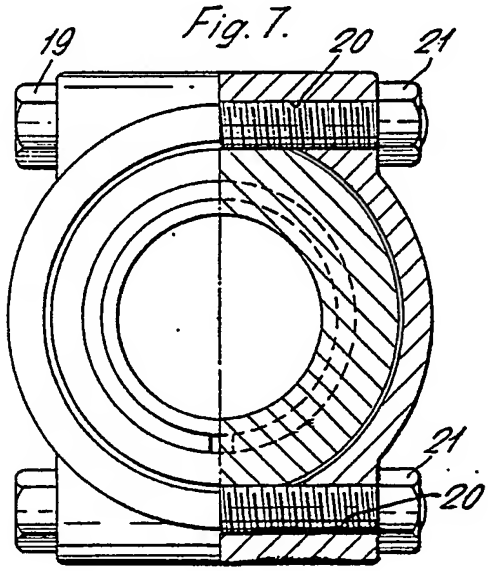


Fig. 7.



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Sheets 2 & 3

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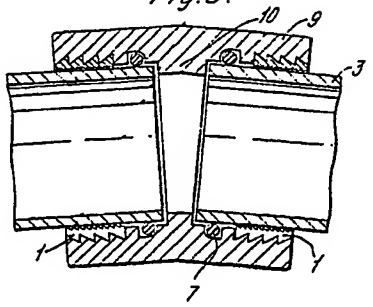

Fig. 6.

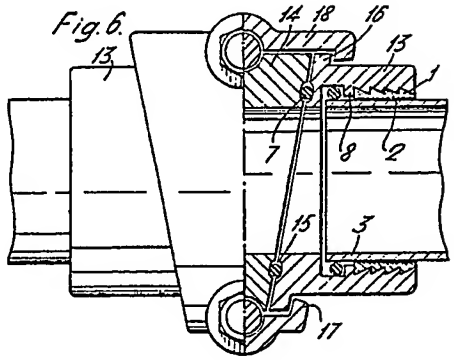

Fig. 5.

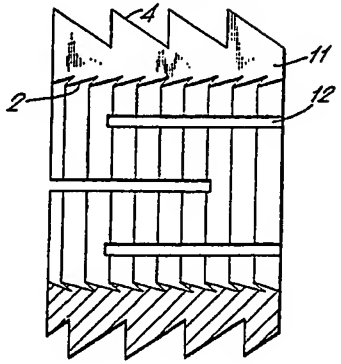

Fig. 7.